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D1K

(54) **Improvements in or relating
to floor coverings**

(57) In order to overcome the drainage problem in the manufacture of artificial turf by tufting it is proposed to displace adhesive from discrete areas of the backing, prior to curing the adhesive, by using a doctoring mechanism. In the preferred embodiment the doctoring mechanism comprises a plurality of air jets which displace the adhesive from the backing so as to leave porous areas thereon whilst ensuring that all of the tufts are coated with adhesive to secure them in position, alternatively, the adhesive may be scraped off the backing or applied by a profiled lick roller.

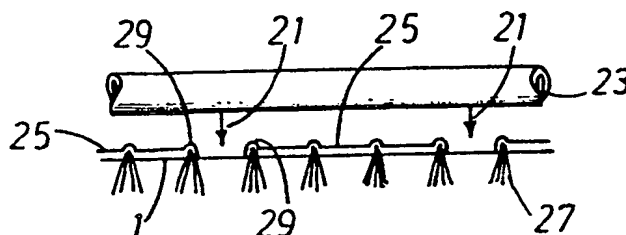
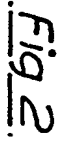


Fig 2.

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SPECIFICATION

Improvements in or relating to floor coverings

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The present invention relates to a floor covering, in particular an artificial turf, and to a method of manufacturing the same.

- Artificial turf is manufactured by one of three methods which are used in the manufacturing of carpets, namely, by weaving, knitting or by tufting. In the case of a turf produced by weaving or knitting the backing is porous, but in the case of a turf produced by tufting an anchor layer has to be applied to the backing to secure the tufts in position and this anchor layer is typically a latex adhesive which after curing forms an impervious layer. In the manufacture of tufted carpets it is desirable to have an impervious carpet, but in the case of an artificial turf this feature prevents water from draining off the turf. Thus, an artificial turf produced by the known tufting method has to be laid in such a way that the water will flow off, or its use has to be confined to areas where it is unlikely to become water logged. Where the turf is to be used as an outdoor surface, e.g. a football pitch, the turf is preferably laid flat, such that draining is a severe problem.

- An aim of the present invention is to produce an artificial turf by the tufting method which is porous.

- One known artificial turf made by the tufting method is rendered porous by forming holes in the anchor layer using a pinned roller or the like. Only small holes are pierced in the anchor layer, presumably to avoid breaking the backing layer, and accordingly the porosity is extremely low.

The present invention aims to produce an artificial turf with a much greater porosity.

- According to the present invention there is provided a method of manufacturing a floor covering comprising forming tufts on a backing web using a tufting machine, applying an adhesive to the backing web for the purpose of adhering the tufts to the backing, and displacing the adhesive from discrete areas of the backing prior to curing of the adhesive using a doctoring mechanism to leave said discrete areas of the backing porous.

- Conveniently, an air jet is employed to displace the adhesive from the backing. The web moves in a longitudinal direction past a row of spaced apart air jets so as to leave a plurality of parallel longitudinal strips along the web which are porous. The spacing of the air jets is adjusted depending on the degree of porosity required.

- The adhesive is preferably a foamed latex adhesive and the air jet or jets have the combined effect of collapsing the air bubbles and displacing the adhesive out of the path of the air jet. With the method according to the

invention all the tufts are coated with adhesive so ensuring that they are satisfactorily secured to the backing whilst at the same time achieving the desired porosity of the backing.

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The method is particularly intended for use in manufacturing artificial turf. The backing and the tufts are made from synthetic fibres or yarns.

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In an alternative, a mechanical doctor blade may be employed to displace the adhesive from the backing prior to curing.

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According to another aspect of the invention there is provided a method of manufacturing a floor covering comprising forming tufts on a backing web using a tufting machine and applying adhesive to the backing web using a profiled lick roller to thereby apply the adhesive in discrete spaced apart parallel bands, leaving uncoated bands of the backing web porous.

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The adhesive is applied at least along the lines of the tufts.

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According to another aspect of the present invention there is provided a floor covering comprising a backing web having applied thereto a plurality of tufts which pass through the backing, and an adhesive coating on the backing positioned so as to adhere the tufts to the backing whilst leaving discrete areas of the backing devoid of adhesive to render those discrete areas porous.

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The discrete areas preferably comprise spaced apart bands extending longitudinally along the length of the backing web.

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The present invention will now be described further, by way of example only, with reference to the accompanying drawings; in which:—

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Figure 1 is a diagrammatic end view showing part of the apparatus for manufacturing a floor covering according to the present invention, and

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Figure 2 is a diagrammatic fragmentary view on line II—II of Fig. 1 showing the disposition of the air jets in relation to the backing web.

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The present invention is concerned with the manufacture of a floor covering having a porous backing and in particular with a method of manufacturing an artificial turf. A tufting machine, not illustrated, is employed to form a loop or cut pile on a backing web. The backing web is conveniently a loose woven synthetic material and the pile is likewise preferably a synthetic material. The method of producing the loop or cut pile on the backing web is by the known carpet manufacturing processes. Thus, successive rows of tufts are formed on the backing web.

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In order to locate the tufts permanently, an adhesive anchor layer is applied to the underside of the backing web. The apparatus for applying the anchor layer is shown diagrammatically in Fig. 1. The tufted backing web 1

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is fed into the apparatus and travels in the direction of arrow A around rollers 3 and 5 to a lick roller 7 where a controlled quantity of adhesive is applied to the underside of the backing web 1. The adhesive 9 is preferably a foamed latex adhesive and may be contained in a reservoir 11. Upon rotation of the lick roller 7 adhesive is picked up and the quantity controlled by a doctor blade 13. Rollers 15 ensure that the backing web contacts the lick roller so that a layer of adhesive is transferred to the backing web. The web then passes around rollers 17 which invert the web which is presented to the doctoring means 19 with the adhesive layer uppermost. At this stage the adhesive layer is still in liquid form.

The doctoring mechanism comprises a plurality of nozzles or orifices spaced across the width of the web by means of which air is played onto the backing web. The air jets are shown at 21 in Fig. 2. Conveniently a tubular manifold 23 with holes drilled therein serves as the air distribution means. Compressed air is introduced into the manifold from a suitable compressed air source. The spacing of the orifices is arranged to obtain the desired porosity. By way of example only two tubular manifolds 23 are shown in the illustration.

The air has the effect of collapsing the bubbles in the foamed latex adhesive and concurrently disperses and displaces it out of the path of the air jet. Thus, after passing the air jet, the backing is virtually devoid of adhesive in that region. Fig. 2 shows diagrammatically how the backing web 1 is devoid of the adhesive layer shown as 25 in the region where the air jets 21 play onto the backing web. The tufts are shown at 27 and respective ridges 29, which extend in the longitudinal direction of the web are formed by threads of synthetic yarn extending between the tufts in successive rows. The air jet effectively displaces the latex adhesive back to the ridges 29 on either side of the backing web onto which the air jet plays. Thus, the adhesive does not form an impervious coating on the backing in this region but the threads of the pile still remain coated so ensuring that they are firmly held in position.

The degree of porosity can be varied by altering the spacing between the air jets 21 or by displacing the jets transversely relative to backing during conveyance of the backing. Thus, a porous undulating band or bands devoid of adhesive are formed on the backing web.

In an alternative method a doctor blade is arranged to displace the adhesive from the backing web. For example, the blade has a flat portion contacting the web and an inclined portion for displacing the adhesive to the left and/or right.

In another method the lick roller is profiled along its length so that adhesive is applied to spaced parallel bands across the width of the

backing web. This arrangement is less preferable since it is difficult to ensure that all the tuft threads are coated with adhesive.

Whilst the air jets preferably operate continuously, it is possible to apply air intermittently in order to generate strips of finite length which are devoid of adhesive. By this method a more uniform porosity can be achieved over a certain area in cases where a lower drainage rate is required.

Having displaced the adhesive from discrete areas of the backing web, the floor covering then passes to a hot air curing oven 31.

The synthetic material may typically be polypropylene or nylon.

CLAIMS

1. A method of manufacturing a floor covering comprising forming tufts on a backing web using a tufting machine, applying adhesive to the backing web for the purpose of adhering the tufts to the backing, and displacing the adhesive from discrete areas of the backing prior to curing of the adhesive using a doctoring mechanism to leave said discrete areas of the backing porous.

2. A method as claimed in claim 1 in which the doctoring mechanism comprises an air jet.

3. A method as claimed in claim 1 in which the web is moved in a direction past a row of transversely spaced apart air jets so as to leave a plurality of parallel longitudinal strips along the web which are porous.

4. A method as claimed in claim 3 in which the spacing of the air jets is adjusted to achieve the desired degree of porosity.

5. A method as claimed in any of claims 1 to 4 in which the adhesive is a foamed latex.

6. A method of manufacturing a floor covering comprising forming tufts on a backing using a tufting machine and applying adhesive to the backing web using a profiled lick roller to thereby apply the adhesive in discrete spaced apart parallel bands, leaving uncoated bands of the backing web porous.

7. A method as claimed in claim 6 in which the adhesive is applied at least along the lines of tufts.

8. An artificial turf manufactured by the method of any preceding claim.

9. A floor covering comprising a backing web having applied thereto a plurality of tufts which pass through the backing, and an adhesive coating on the backing positioned so as to adhere the tufts to the backing whilst leaving discrete areas of the backing devoid of adhesive to render these discrete areas porous.

10. A floor covering as claimed in claim 9 in which the discrete areas comprise spaced apart bands extending longitudinally along the length of the backing web.

11. A method of manufacturing a floor covering substantially as hereinbefore de-

scribed with reference to the accompanying drawing.

12. An artificial turf constructed and arranged substantially as hereinbefore described
5 with reference to the accompanying drawings.

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